

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B , Raja S.C. Mullick Road, Jadavpur, Kolkata-700032

NIT No. IACS-G/ICAM/2023-24/58

Date: 31/01/2024

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful and eligible manufacturer/exclusive distributor/vendors for ONE **Micro-focus Dual Source Single Crystal XRD System with Macromolecular Diffraction Facility**.

Part-I (Technical Bid) of the tender should contain technical specifications in detail as well as commercial terms and conditions. Part-II (Price Bid) should clearly indicate group-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelop, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Completed tender bids should reach the office of the **Registrar, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

Tender Notice No.	NIT No. IACS-G/ICAM/2023-24/58 Date: 31/01/2024
Last date and time of submitting tender	04/03/2024 at 1:00 P.M.
Pre-bid meeting (date, time & place) to discuss technical specification	12/02/2024 at 4:00 PM , In the office of Prof. Amit Majumdar, School of Chemical Sciences, IACS.
Date and time of opening tender (Technical Bids)	04/03/2024 at 4:00 P.M.
Place of opening tender (Technical Bids)	In the office of Prof. Amit Majumdar, School of Chemical Sciences, IACS.
Date and time of opening of Price Bid	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.
Contact	Email: icam@iacs.res.in Tel: +91 33 2473 4971 (Ext 1165)

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

Technical Bid Evaluation: The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

Opening of price-bid: The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

Quotations received incomplete or beyond the stipulated time will be summarily rejected.

Bidders should submit their past experience for 10 years of supplying and successful installation of similar units to other research Institutes/Universities/other organizations in India and abroad. Please provide documentary proofs of such successful installation and supportive documents that the instruments are running successfully.

Pre-Qualification Criteria: Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed. An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well as after sale service guarantee for 10 years from the installation. OEM should be internationally reputed branded company.

1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as 'TECHNICAL BID' on the outer cover of the envelop as already detailed above. **It should be clearly mentioned on the envelope as "Micro-focus Dual Source Single Crystal XRD System with Macromolecular Diffraction Facility".**

Technical Specification for a Micro-focus Dual Source Single Crystal XRD System With Macromolecular Diffraction Facility

All of the items/specifications listed below must be included in the offer.

1.	Micro-focus Dual Source Single Crystal XRD system With Macromolecular Diffraction Facility <u>Latest generation dual source single crystal X-ray diffractometer which should be able to measure both small molecule & macromolecular crystals.</u> Such an instrument should be optimally configured to achieve the best quality data from small, weakly diffracting crystals of wide range of organic, inorganic, metal organic, MOFs and most importantly protein crystals with unit cell dimensions typically > 50 Å, and commonly >200 Å. This ideally need a combination of a small, highest-intensity X-ray beam of low-to-moderate divergence coupled with a four-axis goniometer and a large area photon-counting detector. The system should be fully contained within an X-ray safety enclosure of sufficient internal space to enable convenient mounting of protein crystals from liquid nitrogen Dewars.
(i)	Mounting and Cooling Facility: Floor mounted system for dedicated use in a laboratory with full future upgradeability paths on sources and detectors at site. The X-ray diffractometer system should overall be air-cooled without any need for external chillers or need for in-house chilled water facilities.
(ii)	Sample/Detector Positioning System and Goniometer: The diffractometer should be equipped with a fully automated high precision 4-circle Goniometer with high precision and all axes and detector distance automatically controlled through the system computer. The goniometer must be built in such a way that the extended directions of the axes intersect at a point, with an error not greater than 7 microns. The 2-theta arm shall have a universal mount compatible with the vendor's full range of detectors. The sample to the detector distance should be variable under computer control over a range of at least 35-200 mm or longer. Any diffractometer damage through 'collisions' should be prevented by provisions taken in software and ideally using real-time system positional monitoring. It should have

	very high angular precision and high angular coverage of minimum 150° 2Theta. The system must include a color video microscope which records color images of the crystal mounted on the goniometer platform to assist alignment, monitoring, and face-absorption corrections. In addition, provision should be available to transfer and store images. Recalibration of the goniometer on-site is a requirement.
(iii)	X-ray Detector & Optics: • X-ray Detector: Should operate in Hybrid Photon Counting Detector (HPC)/Hybrid Pixel Array detector (HPAD)/Charge-integrating Pixel Array Detector (CPAD) or any other advances or upgraded detector preferably with no dead areas for detecting the diffracted X-rays and accurately measuring their intensities of diffraction pattern from single crystals to achieve the highest detector sensitivity and superior spatial resolution for closely spaced reflection generated by twin and long unit cell protein crystals. The active area should be, at least 100 cm² or larger with higher theta coverage in single image (minimum of 70 degrees in 2Theta at 7 cm distance) to achieve fast completeness (reducing the radiation damage) and measure highly redundant data for more accurate structures. The detector preferably of monolithic sensor without any gaps or blind region which are prone to loss of data. The detector should have high count rate of $\geq 4 \times 10^6$ counts/pixel-sec. Ideally, the X-ray detector should avoid losses due to fiber-optic stubs/tapers in its construction, should have a point spread function of ≤ 1 pixel, should be matching the pixel size of the sensor and the pixel size should be equal to or less than 150µm×150µm. The Dynamic quantum efficiency of the detector should be $\geq 90\%$ for both Cu-Kα and Mo-Kα radiation and the dynamic range should be better than $> 2 \times 10^5$ to capture very weak as well as very strong reflections on a single frame. The Detector should operate under shutter-less mode for continuous and fast data collection. Preferably, the detector should feature low power sensors and shall not require regular maintenance. The detector should have high signal to noise ratio with virtually noise free readout electronics and should be capable of true shutter-less operation, with auto air cooled facility. Readout time should be 15 ms or less.
(iv)	Environment: Operating Temperature: Approximate: 18-30°C. Operating Humidity: Approximate 5-80% RH.
(v)	X-ray Source: • Dual micro focus X-ray generator with Copper and Molybdenum radiation having a minimum power output of 50W or more. Ideally, the X-ray source must be completely air-cooled without the need of any internal or external water chiller to achieve stable intensity and long tube life. However, if an additional internal or external water chiller is required then the vendor should specify the details of the chiller along with maintenance and expected maximum intensity decay per year. To minimize the downtime the entire source shall maintain a minimum of 80% of the specified intensity for at least 3 years after installation. High precision multilayer type optics should operate under vacuum to prevent radiation damage of the mirrors and to give long

	term stability. It should deliver a monochromatic X-ray beam of spectral purity >95% for both Cu K-alpha and Mo K-alpha radiation. The X-ray source should comply with statutory safety regulations. • The minimum beam intensity of Cu radiation at the sample should be $\geq 8 \times 10^{10}$ ph/(s-mm²) at beam divergence ≤ 13.6 mrad with beam size not exceeding 100 microns. The beam divergence should be adjustable to selected settings in the range 3.0-13.6 mrad such that the beam remains circular symmetrical with a stable center of peak intensity. • The minimum Molybdenum beam intensity at the sample should be $\geq 3 \times 10^9$ ph/(s-mm²) at beam divergence ≤ 5.0 mrad with beam size not exceeding 150 microns. • One should be able to collect the diffraction data by using both Molybdenum and Copper radiation without the need for replacing the X-ray tube as well as without modifying the optics. The switching over from one radiation to another should be user friendly, instantaneous, and controlled through computer with fast interchange of system settings.
(vi)	Safety/ Radiation enclosure: Fully X-ray protected enclosure as per international safety norms.
(vii)	Temperature Control Unit: • A low temperature (LT-) device should be of Oxford Cryosystems make and include a temperature control device to cover the temperature range of 80-400 K, with a stability of +/- 0.1 K over the whole temperature range equipped with liquid nitrogen Dewar/s of minimum 60 L Liters capacity, pressure regulator, auto refill unit with refill-ready cryostream system, transfer line and necessary accessories • The required pressure regulators, valves, transfer line, line heater and other necessary accessories should be quoted. Auto transfer facility for the Dewars should also be quoted. • The sample temperature should be set and varied in a stepwise fashion by the instrument control software to allow for easily creating variable temperature measurements.
(Viii)	Computer and Printer: The Diffractometer should come with latest generation PC with i9-12900, 16 GB RAM, 256 GB SSD, one 2.0 TB external hard disk drive, 27" LED monitor, with factory loaded Software, licensed Windows operating system. Also, a color laser jet printer must be offered locally.
(ix)	Application software: A fully integrated WINDOWS based licensed software handling the instrument for data collection and processing for both small and protein crystallography must be an integral part of the system. The software should be of site license to be able to install on any number of PCs within the campus. (a) The software suite provided with the system shall consist of a complete suite of well tested and user proven routines for the collection and integration of frame data on single crystals, and for solving, refining, and displaying single crystal structures. (b) Software shall allow remote access to the instrument including diffractometer, goniometer, and X-ray generator functions to setup the experiment, view data as collected, process the data, and solve and refine the structures remotely or off-line. (c) Software for auto structure solution, twins, low/high temperature, high pressure,

	charged density and modulated structure should be included. (d) An unlimited number of data integration and analysis software licenses should be available so that all local and remote dependents of the equipment should have the capability to analyze the data independently. (e) Manufacturer must offer their latest version of licensed software developed by them. No public domain software is acceptable. There must be an undertaking that updates to the instrument control/data collection and automated structure solution and refinement software will be provided as available free of charge and in perpetuity. (f) For data collection strategies, the software shall have predefined runs including Sphere, Hemisphere and Quadrant. Optimized runs shall provide for completeness / coverage as well as the facility for user defined runs. Software shall allow easy change of exposure time, scan ranges, scan width and detector distance and provide automatic re-measurement of overflow frames, automatic dark image acquisition and optional reference frames for tracking decaying samples. (g) The offered data acquisition software package must be compatible with SHELX, WINGX and OLEX2.
(x)	Test crystal: One (1) test crystal for calibration to be included in the basic system
(xi)	Goniometer Head and beamstops: Two (02) nos. of Manual Goniometer head with strong magnetic base in the basic system. Required number of beamstops with appropriate dimensions should be included in the basic system.
(xii)	Spares: Spares as per standard practice should be provided. The detail list of spares to be enclosed with the offer for evaluation purpose. Supplier should confirm the availability of spares for next 10 years from the date of installation.
(xiii)	Crystal mounting accessories: Paratone or any equivalent crystal mounting cryoprotectant oil (100ml) – 2 No Crystal Mounting set: ▪ 40-Dual-Thickness MicroMounts™ (M2-L18SP-A1 + M2-L18SP-A2), with 5 each of 10, 20, 30, 50, 75, 100, 150, and 200 µm apertures ▪ 20-GB-B3-R Style Reusable Goniometer Bases ▪ 10 Magnetic Cryovials ▪ 1-4oz. Bottle of NVH Oil ▪ 1-Baseholder and Protective Storage Case ▪ 1-pair heavy-duty tweezers, for inserting the MicroMounts™ into the bases Cryo-loop: cryo-loops of different sizes (0.1-0.2, 0.2- 0.3, 0.3-0.4, 0.4-0.5, 0.5- 0.6, and 0.6-0.7mm -25 each) for cryo-mounting.
(xiv)	Warranty: The single crystal X-ray diffractometer system including X-ray tubes, detector, cryo system, and UPS quoted for it should be under comprehensive warranty for three (03) years from the date of installation. Any repair work or replacement of spares needs to be done on site, the manufacturer of the XRD must confirm this in their quotation.
(xv)	Data Qualification criteria: The data collected in the offered XRD system must be publishable as per the Acta Crystallographica guideline. This is applicable for both Mo and Cu radiation.
(xvi)	Pre-Installation requirement: Necessary pre-installation advice should be enclosed along with the technical bid.
(xvii)	Installation, Commissioning, and Application Training: Installation and training should take place at IACS Site free of cost. On site application training for minimum

	4 days by the company designated application Scientist for a group of technical staff/students for operating the instrument to complete structure determination/solution including software learning.
(xviii)	Service facility and down-time call attendance: Supplier should clearly mention about their service set up in India (preferably in Kolkata) for prompt service support along with contact details of service engineers specially trained on the offered system. Service should be provided within 2 working days from the report of technical problem so that machine down time is minimized. Service should be provided at earliest and 24 X 7 online support should be available. In case the Equipment / System remains non-operational for more than 7 working days then warranty period will be extended for the equivalent period for which Equipment / System remained non-operational. Warranty extension in such case shall be done without prejudice to any other Term & condition of the contract.
(xix)	Installation in India: Detailed list of at least ten (10) installed systems XRD systems (single or dual source) within the last 10 years in India with contact details of indenter, installation certificates and user satisfaction reports must be provided. There should be at least ONE (01) installed XRD systems being used for macromolecular diffraction facility installed within the last 5 years in India (detailed information, installation certificate and user satisfaction report to be provided).
2	Microscope for sample selection: A stereo-zoom optical microscope with polarizer for crystal mounting from internationally reputed company must be included in the offer.
3	UPS for the single crystal X-ray diffractometer system: Suitable reputed make 3-phase input, 3-phase output 10 KVA on-line UPS with built-in isolation transformer and event logging facility to run the above-mentioned system including any external water chiller and computer for uninterrupted data collection for at least 1 hour. After sales service should be provided by the Vendor.
4	Manuals / Circuit-Diagrams and Instruction Sheets: All the manuals including circuit Diagrams and instruction sheets must be supplied in English for the purpose of service engineer's reference. The offered XRD system model should preferably comply with the latest machinery directive, for electrical equipment and electromagnetic compatibility under fully CE compliant guidelines (or equivalent).
5	Annual Maintenance Contract (AMC): Annual maintenance contract (AMC) for TWO (02) years effective soon after the expiry of the comprehensive warranty period of THREE (03) years should be included in the offer. AMC must mention the number of preventive maintenance visits in a year. Required minimum number of visits (regular maintenance + breakdown call) should be at least 2 + 1.
6	Validity of quotation: Minimum 3 months.
7	Tender should be submitted in two parts -technical and financial. Each bid should be sealed within separate envelopes and duly superscribed. Both these sealed envelopes should then be placed within a big envelop and the big envelop should be sealed and superscribed.
8	Compliance Chart: Detailed compliance chart must be provided along with supporting documents showing the complied technical specifications clearly highlighted and preferably cross-referencing with the page numbers of the supplied supporting documents. Only the mention of "COMPLIED" in the compliance chart will not suffice.

Please SUBMIT ITEMIZED QUOTES with separate pricing for each accessory.

A compliance table (see below) must be prepared and submitted along with the technical bid.

Sr. No	Tender specification	Your offered instrument specification	Extent of compliance

Tender will not be accepted if the technical compliance chart is NOT provided following the above format.

2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as ‘PRICE BID’ on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: Price to be quoted on BOTH CIF Kolkata and FOB basis.

3. BID SECURITY:

An Account payee Demand Draft of any of the Commercial Banks for **Rs. 20,00,000/-** (Rupees Twenty Lakhs only) drawn in favour of “Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)” is to be furnished by the bidders along with Technical Bid, except Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or are registered with the Central Purchase Organisation or the concerned Ministry or Department.

Alternatively, the bidder shall have the option to furnish EMD in the form of Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks. The Bid-Security should have at least 90 (ninety) days validity period beyond the final bid validity period.

In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

4. PERFORMANCE SECURITY:

An Account Payee Demand Draft on any commercial bank of India or Bank Guarantee (BG) of any Commercial Bank preferably located at Kolkata of **10%** of the order value in the name of “Indian Association for the Cultivation of Science” is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of

completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money.

5. TERMS OF PAYMENT:

Payment will be made through irrevocable Letter of Credit in two instalments. 90% of the money will be released on submission of shipping of documents. Remaining 10% will be released after successful installation of the instrument and upon submitting PBG.

6. GENERAL INSTRUCTIONS:

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
2. The tender should accompany a compliance chart.
3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally to visit the website (www.iacs.res.in/tender) for any amendment.
5. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
6. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
7. The model number, make and a printed literature of the product should be submitted positively.
8. Proposed delivery schedule should be mentioned clearly.
9. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
10. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
11. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
12. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
13. In case of any dispute, the decision of IACS authority shall be final and binding on the bidders.
14. In case of any litigation the matter will be dealt within the jurisdiction of the High Court of Calcutta only
15. For any clarification regarding technical specifications, information etc., please send your queries to Dr. Amit Majumdar (icam@iacs.res.in).
16. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Registrar